

# Potential Impacts of Hydraulic Fracturing on Drinking Water Resources: Study Update

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# A Year in Review

Progress Report  
release\*



Technical  
Roundtables\*/  
Docket opens



Technical  
Roundtable\*

*\*Webinars conducted to  
provide updates*

# Progress Report

- Includes project-specific updates
  - Research approach
  - Status as of Sept. 2012
  - Next steps
- Does not include research results
- Available at [www.epa.gov/hfstudy](http://www.epa.gov/hfstudy)



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Progress Report  
release\*



SAB forms ad hoc  
expert panel



SAB Panel  
Consultation



Technical  
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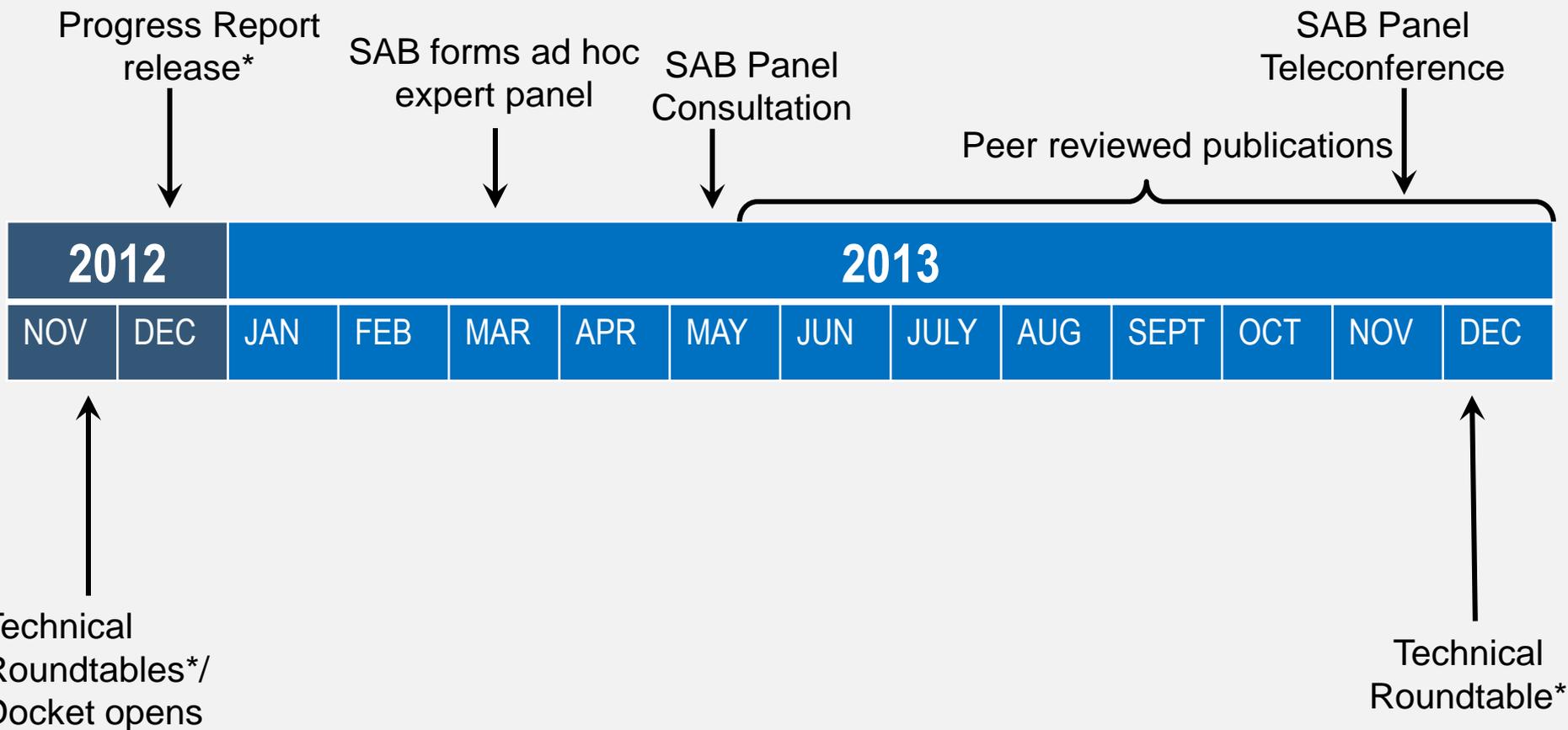
Technical  
Roundtable\*

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# Science Advisory Board (SAB)

- On May 7-8, 2013, the SAB Hydraulic Fracturing Research Advisory Panel provided consultation on EPA's study
- In general, panel members:
  - Were impressed with EPA's accomplishments regarding the study given the time and other resource constraints, including the thoroughness and complexity of the research
  - Acknowledged the challenge EPA faces in presenting findings to a broad audience
- Panel members recommended that EPA:
  - Capture basin specific trends and location specific conditions (geology, hydrology)
  - Use professional judgment when making assumptions and interpreting results
  - Write clearly and provide enough detail to inform the public and prevent misinterpretation of data and images, including assumptions and uncertainty
  - Continue to stay informed about new industry practices and technologies
  - Manage expectations about what will be included in the report of results

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# Research Projects and Products

17 research projects are expected to produce >30 peer-reviewed journal papers or EPA reports

- Most will undergo an internal (EPA) and an external (journal or letter) peer review
- To date, 5 papers have been published in scientific journals
  - Subsurface migration modeling (3)
  - Analytical method development (2)

These products will be considered together with scientific literature in the draft assessment report

- Draft assessment report is a HISA

# Peer Reviewed Publications

## Analytical method development:

- DeArmond, P. D. and DiGoregoria, A. L. 2013. Characterization of liquid chromatography-tandem mass spectrometry method for the determination of acrylamide in complex environmental samples. *Analytical and Bioanalytical Chemistry* 405 (12): 4159-66.
- DeArmond, P. D. and DiGoregoria, A. L. 2013. Rapid liquid chromatography-tandem mass spectrometry-based method for the analysis of alcohol ethoxylates and alkylphenol ethoxylates in environmental samples. *Journal of Chromatography A* 1305:154-63.

## Subsurface migration modeling:

- Rutqvist, J., Rinaldo, A. P., Cappa, F., Moridis, G.J. 2013. Modeling of fault reactivation and induced seismicity during hydraulic fracturing of shale-gas reservoirs. *Journal of Petroleum Science and Engineering* 107: 31-44.
- Kim, J. and Moridis, G. J. 2013. Development of the T+M coupled flow–geomechanical simulator to describe fracture propagation and coupled flow–thermal–geomechanical processes in tight/shale gas systems. *Computers and Geosciences* 60: 184-198.
- Moridis, G. J. and Freeman, C. M. 2013. The RealGas and RealGasH2O Options of the TOUGH+ Code for the Simulation Of Coupled Fluid And Heat Flow in Tight/Shale Gas Systems. *Computers and Geosciences*. (Accepted/ currently in press. *Manuscript available online*)

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SAB Panel  
Consultation

SAB Panel  
Teleconference

Peer reviewed publications



Technical  
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Docket opens

Analytical Chemical  
Methods\*

Well Construction/  
Operation and  
Subsurface  
Modeling\*

Subsurface  
Modeling  
Follow up \*

Water Acquisition  
Modeling\*

Wastewater Treatment and  
Related Modeling\*

Case  
Studies\*

Docket  
closes

Technical  
Roundtable\*

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2013 Technical workshop series

# Next Steps

## **EPA will continue to conduct research, analyze information and literature, and engage stakeholders**

- Completed research will undergo peer review
- Exchange information with industry, academia, states, NGOs, tribes, and public
- Update SAB panel on publications and research
- Release draft report in late 2014
  - The SAB Panel will peer review the draft report
  - The public will have an opportunity to provide written and oral comments